(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 8 January 2004 (08.01.2004)

PCT

(10) International Publication Number WO 2004/003650 A1

(51) International Patent Classification⁷: G09G 3/34

G02F 1/167,

SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG,

(21) International Application Number:

PCT/IB2003/002857

(22) International Filing Date:

19 June 2003 (19.06.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

02077610.0

1 July 2002 (01.07.2002)

(71) Applicant (for all designated States except US): KONIN-KLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): JOHNSON, Mark, T. [GB/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(74) Agent: DEGUELLE, Wilhelmus, H., G.; Philips Intellectual Property & Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,

US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO. SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

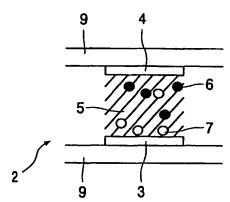
as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ELECTROPHORETIC DISPLAY PANEL



WO 2004/003650 A1

(57) Abstract: An electrophoretic display panel (1), for displaying pictures having a plurality of picture elements, has a plurality of pixels (2) and drive means (100). The pixels (2) have a first electrode (3) and a second electrode (4) for receiving a potential difference, and an electrophoretic medium (5) which is present between the first electrode (3) and the second electrode (4). The medium (5) has a first and a second extreme optical state and an intermediate optical state, intermediate between the first and the second extreme optical state. For the display panel (1) to be able to display a reproducible intermediate optical state, the drive means (100) are able to control, in operation, the potential difference for changing the optical state between the first extreme, the second extreme and a singular equilibrium optical state as the intermediate optical state, in dependence of the picture element to be dis $\frac{1}{2}$ played.

BEST AVAILABLE COPY

INTERNATIONAL SEARCH REPURI

Internation upplication.No.. PCT/ib J3/02857

19 5 1 1 Texas 5 5 5

A. CLASSIFICATION OF SUBJECT MATTER TO SUBJECT M

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols) IPC 7 G02F G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	
US 4 833 464 A (DI SANTO FRANK J ET AL)	1-3	
column 3, line 51 -column 4, line 43 column 5, line 26 -column 6, line 31 column 7, line 13 - line 39 column 8, line 20 - line 49 column 9, line 22 -column 10, line 10 abstract; figures 1-7	4,5	
WO 95 06307 A (COPYTELE INC ;DISANTO FRANK J (US); KRUSOS DENIS A (US)) 2 March 1995 (1995-03-02)	1-3	
page 4, line 1 -page 5, line 10 page 7, line 4 - line 17 page 9, line 3 - line 25 abstract; figures 1,2	4,5	
	US 4 833 464 A (DI SANTO FRANK J ET AL) 23 May 1989 (1989-05-23) column 3, line 51 -column 4, line 43 column 5, line 26 -column 6, line 31 column 7, line 13 - line 39 column 8, line 20 - line 49 column 9, line 22 -column 10, line 10 abstract; figures 1-7 WO 95 06307 A (COPYTELE INC; DISANTO FRANK J (US); KRUSOS DENIS A (US)) 2 March 1995 (1995-03-02) page 4, line 1 -page 5, line 10 page 7, line 4 - line 17 page 9, line 3 - line 25 abstract; figures 1,2	

**Further documents are listed in the continuation of box C:	χ Patent family members are listed in annex:
Special categories of cited documents: A* document defining the general state of the art which is not considered to be of particular relevance E* earlier document but published on or after the international filling date C* document which may throw doubts on priority clalm(s) or which is cited to establish the publication date of another citation or other special reason (as specified) O* document referring to an oral disclosure, use, exhibition or other means P* document published prior to the international filing date but later than the priority date claimed	 *T* later document published after the international filing date or priority date and not in conflict with the application but ciled to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
Date of the actual completion of the international search	Date of mailing of the international search report
24 October 2003	03/11/2003
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2	Authorized officer
NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Wahl, M

BEST AVAILABLE COPY

INTERNATIONAL SEARCH REPORT

PCT/15 03/02857

		PCT/15 03	/0285/				
C.(Continua	(Continuation) DOCUMENTS CONSID						
Calegory °	Citation of document, with Indication, where appropriate, of the relevant passages		Relevant to claim No.				
Υ	EP 0 526 135 A (CANON KK) 3 February 1993 (1993-02-03) figure 7		4,5				
A	WO 93 06585 A (COPYTELE INC) 1 April 1993 (1993-04-01) page 12, line 20 -page 13, line 9 page 15, line 27 -page 16, line 11 abstract; figures 1,5		1-4				
زميده ميون	0						
i							
			Ì				
	·						
			11.30				
ı							
		•					
		•					
			•				
ı							
l							

INTERNATIONAL SEARCH REPORT

on on patent family members

Interna Application No.
PCT/ID 03/02857

10 3521 . . .

Patent document cited in search report	T	Publication date		Patent family member(s)	Publication date
US 4833464	A	23-05-1989	NONE		
WO 9506307	Α	02-03-1995	CA EP JP WO	2170263 A1 0715751 A1 9504618 T 9506307 A1	02-03-1995 12-06-1996 06-05-1997 02-03-1995
EP 0526135	A	03-02-1993	JP JP AT DE DE EP US US	3029489 B2 5034702 A 165921 T 69225362 D1 69225362 T2 0526135 A1 5438442 A 5317437 A	04-04-2000 12-02-1993 15-05-1998 10-06-1998 17-09-1998 03-02-1993 01-08-1995 31-05-1994
WO 9306585	Α	01-04-1993	CA WO DE DE EP JP	2119247 A1 9306585 A1 69123605 D1 69123605 T2 0604423 A1 6510370 T	01-04-1993 01-04-1993 23-01-1997 03-04-1997 06-07-1994 17-11-1994